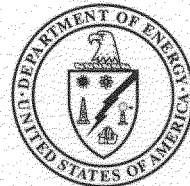


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ICDF Complex Material Profile Guidance



Idaho National Engineering and Environmental Laboratory

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ABSTRACT

This waste guidance will assist generators with waste streams destined for disposal at the INEEL CERCLA Disposal Facility Complex. For the purposes of this document, the overall goal of waste characterization is to develop a conservative but appropriate way to: 1) characterize waste for entry into the INEEL CERCLA Disposal Facility Complex, 2) ensure compliance with the Waste Acceptance Criteria, and 3) facilitate disposal at the INEEL CERCLA Disposal Facility landfill or evaporation pond. Other documents prepared for the INEEL CERCLA Disposal Facility Complex and its related units identify the policies and procedures that govern waste acceptance and management at the INEEL CERCLA Disposal Facility Complex. This guidance is not designed to duplicate those documents, but to provide a roadmap to the controlling documents that assists the generator in developing Material Profiles.

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ACRONYMS

AOC	area of contamination
ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
EPA	Environmental Protection Agency
ICDF	INEEL CERCLA Disposal Facility
IDAPA	Idaho Administrative Procedures Act
IDW	investigation-derived waste
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IWTS	Integrated Waste Tracking System
LDR	land disposal restriction
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOD	Notice of Disturbance
NRC	U.S. Nuclear Regulatory Commission
O&M	operations and maintenance
OU	operable unit
OWTF	On-Site Waste Tracking Form
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RD/RA	remedial design/remedial action
RD/RAWP	Remedial Design/Remedial Action Work Plan

RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
SAP	Sampling and Analysis Plan
SSSTF	Staging, Storage, Sizing, and Treatment Facility
TRU	transuranic
TSCA	Toxic Substances Control Act
VO	volatile organic
WAC	Waste Acceptance Criteria
WAG	waste area group

ICDF Complex Material Profile Guidance

1. PURPOSE

This document provides guidance for preparing Material Profiles for acceptance into the INEEL CERCLA Disposal Facility (ICDF) Complex. Other documents prepared for the ICDF Complex and its related units (e.g., treatment, landfill, and evaporation pond) identify the policies and procedures that govern waste acceptance and management at the ICDF Complex. This document provides a roadmap to properly characterize waste streams destined for the ICDF Complex, based on the following documents:

- *ICDF Complex Waste Acceptance Criteria* (DOE-ID 2002a)
- *ICDF Landfill Waste Acceptance Criteria* (DOE-ID 2002b)
- *ICDF Evaporation Pond Waste Acceptance Criteria* (DOE-ID 2002c)
- “Waste Tracking Plan for the INEEL CERCLA Disposal Facility Complex” (PLN-914)
- *ICDF Complex Waste Verification Sampling and Analysis Plan* (DOE-ID 2003).

The waste acceptance process outlined in these documents has been established to ensure that waste is accepted, managed, and disposed in a manner that is within the operational limits of the ICDF Complex, including environmental regulations, Department of Energy (DOE) Orders, Technical Safety Requirements, Sampling and Analysis Plans (SAPs), and other applicable requirements.

Only remediation waste from Idaho National Engineering and Environmental Laboratory (INEEL) Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) activities will be accepted for disposal at the ICDF Complex. The ICDF Complex is located near the southwest corner of the Idaho Nuclear Technology and Engineering Center (INTEC) and immediately west of the existing percolation ponds. The area of the ICDF Complex, including a buffer zone, covers approximately 40 acres, with a landfill disposal capacity of approximately 510,000 yd³. The components of the facility include the landfill disposal cells, an evaporation pond with two cells, and the Staging, Storage, Sizing, and Treatment Facility (SSSTF). The ICDF Complex and its components are developed in accordance with the Operable Unit (OU) 3-13 Record of Decision (ROD).

All waste destined for the ICDF Complex must meet the ICDF Complex Waste Acceptance Criteria (WAC) and the specific WAC of the landfill or evaporation pond, depending on the ultimate disposition of the waste. This guidance describes the requirements for successfully developing a Material Profile for approval at the ICDF Complex.

2. SCOPE

This document applies to all generators of CERCLA remediation waste within the INEEL that plan to dispose of remediation waste streams at the ICDF Complex.

This document applies to all generators of CERCLA removal and remediation wastes within the INEEL that plan to dispose of such waste streams at the ICDF Complex.

Generators of CERCLA remediation waste that is destined for disposal at the ICDF Complex must be familiar with the guidelines in this document as well as the WAC for the ICDF Complex and its related units (e.g., treatment, disposal).

3. ROADMAP TO ICDF COMPLEX CHARACTERIZATION REQUIREMENTS

This section describes the general requirements and process for completing a Material Profile for wastes destined for the ICDF Complex, and provides material on locating detailed information about these requirements. This guidance sets forth the major requirements and bases for accepting waste at the ICDF Complex, but the generator must be familiar with the primary documents themselves.

3.1 ICDF Material Profile Guidance Organization

This guidance document describes the administrative and regulatory requirements necessary to properly characterize, describe, and identify the generator's waste stream and the key parameters that drive operations at the ICDF Complex. The following sections are organized as follows:

- Section 4—CERCLA Requirements: Since the ICDF Complex operates solely for the purposes of implementing the OU 3-13 ROD and facilitating CERCLA remediation at the INEEL, it is important to understand the relationship between the CERCLA requirements for each generating site and the CERCLA requirements that drive operations at the ICDF Complex. This section describes those requirements and the assumptions upon which the ICDF Complex accepts Material Profiles.
- Section 5—Generator Responsibilities: Primarily, the generator is required to properly characterize each waste stream destined for the ICDF Complex. The ICDF Complex accepts Material Profiles on the assumption that the generator will comply with the documentation developed during a CERCLA remediation process. Acceptance of waste at the ICDF Complex is contingent on implementation of these documents and other responsibilities outlined in this section.
- Section 6—ICDF Complex Waste Acceptance Process: This section outlines the process for waste acceptance at the ICDF Complex, and refers the generator to the relevant portions of existing ICDF Complex documents (e.g., WAC, Verification SAP).
- Section 7—References: This section provides references for the documents used to prepare this guidance.
- Appendixes: This section contains examples of the material and container profiles and shipment tasks required from each generator for each waste stream (Appendixes A, B, and C).

3.2 ICDF Document Roadmap

This section describes the general requirements and process for completing a Material Profile for wastes destined for the ICDF Complex, and where to locate detailed information about these requirements. This guidance sets forth the major requirements and bases for accepting waste at the ICDF Complex, but the generator must be familiar with the primary documents themselves.

An understanding of the documents described below is vital to the preparation of Material Profiles that facilitate waste acceptance into the ICDF Complex. These documents will be referenced throughout this guidance.

- ICDF Complex WAC: The ICDF Complex WAC (DOE-ID 2002a) identifies the requirements that apply to all waste streams entering the ICDF Complex. This document integrates all waste

acceptance procedures at the ICDF Complex, including the ICDF SSSTF. The primary elements of the ICDF Complex WAC include the following

- Responsibilities (Section 1.5)
 - Criteria basis (Section 4.1)
 - Waste Acceptance Criteria for the ICDF Complex (Section 5)
 - Waste content or concentration accepted at the SSSTF for the ICDF Complex (Section 5)
 - Waste form and container requirements for the ICDF Complex (Section 5)
 - Exceptions to WAC requirements (Section 2.2.1)
 - Prohibitions (Section 5.2)
 - Waste Acceptance Criteria for the treatment unit (Section 6)
 - Waste content or concentration accepted at the treatment unit (Section 6)
 - Waste form and container requirements for the treatment unit (Section 6).
- ICDF Landfill WAC: The ICDF Landfill WAC (DOE-ID 2002b) identifies the operational limits of the ICDF landfill. This WAC specifies the chemical and radiological requirements for the disposal of solid waste (e.g., soil, debris) in the ICDF landfill.
 - ICDF Evaporation Pond WAC: The ICDF Evaporation Pond WAC (DOE-ID 2002c) specifies the chemical and radiological requirements for disposal of aqueous waste in the ICDF evaporation pond.
 - Waste Tracking Requirements: The Waste Tracking Plan for the ICDF Complex (PLN-914) describes how waste will be tracked at the ICDF Complex. Section 2 of the Waste Tracking Plan describes the Integrated Waste Tracking System (IWTS) material profiling process in detail.
 - Waste Characterization and Verification Requirements: The *ICDF Complex Waste Verification Sampling and Analysis Plan* (DOE-ID 2003) describes the approach to verify that wastes accepted at the ICDF Complex are bounded by the Material Profile submitted by the ICDF Complex user. The purpose of this document is to provide the requirements for verification of untreated waste destined for disposal in the ICDF landfill. Verification is required to confirm that the key parameters in the waste, i.e., those parameters that limit acceptance of waste in the landfill as defined by landfill WAC and/or operational limits, do not exceed the limits on the Material Profile. Verification will be performed independent of the organization generating and characterizing the waste.

4. CERCLA REQUIREMENTS

This section describes the CERCLA requirements under which the ICDF Complex operates, and describes important operational documents. It also describes the generator's CERCLA responsibilities, and explains the relationship between ICDF Complex documents and the generator's CERCLA documentation.

4.1 ICDF Complex Requirements

The generator must be familiar with the regulatory and operational structure of the ICDF Complex. This section describes the documents and operational requirements for the ICDF Complex.

4.1.1 Background

The U.S. Department of Energy Idaho Operations Office (DOE-ID) authorized a remedial design/remedial action (RD/RA) for INTEC to satisfy the requirements of the Waste Area Group (WAG) 3, OU 3-13, ROD (DOE-ID 1999). The ROD selected "Removal and On-Site Disposal" as the remedy for OU 3-13, Group 3, "Other Surface Soils." To support this remedy, the ROD requires that an on-Site landfill be constructed to receive CERCLA remediation wastes generated at the INEEL. The ICDF Complex is the on-Site facility designed and constructed to implement the ROD requirements.

The ICDF Complex is the consolidation point for CERCLA-generated wastes within the INEEL boundaries. In addition to receiving WAG 3 waste, the landfill also will be able to receive CERCLA-generated wastes outside WAG 3 that meet the land disposal restriction (LDR) requirements in accordance with the landfill WAC (DOE-ID 2002a). (Waste generated within the WAG 3 area of contamination [AOC] that has not triggered placement is not required to meet LDR criteria.) The ICDF landfill meets the substantive requirements of Resource Conservation and Recovery Act (RCRA) Subtitle C (42 USC 6921 et seq.), Idaho Hazardous Waste Management Act (HWMA 1983), DOE Order 435.1, and Toxic Substances Control Act (TSCA) polychlorinated biphenyl landfill design and construction requirements (15 USC 2601 et seq.).

4.1.2 General Operational Requirements for the ICDF Complex

The OU 3-13 ROD outlines applicable or relevant and appropriate requirements (ARARs) for the operation of the ICDF Complex. Compliance with the ARARs and design standards for the liner establish the operational limitations of the ICDF Complex. The Remedial Action Work Plan (RAWP) and the Operations and Maintenance (O&M) Plan provide additional information about operational requirements at the ICDF Complex.

4.1.3 ICDF Complex Operations

The ICDF Complex only accepts waste streams generated by CERCLA activities (i.e., investigation, Notice of Disturbance [NOD], removal, or remediation) at the INEEL. Generators of CERCLA removal and remediation waste that is destined for disposal at the ICDF Complex must be familiar with the guidelines in this document, as well as ICDF Complex operations described in the ICDF Complex RAWP and the ICDF O&M Plan. These documents were developed to ensure compliance with the OU 3-13 ROD and the protection of human health and the environment. Additional documents such as the ICDF Complex, landfill, and evaporation pond WAC were developed to ensure that the operational limits of the ICDF Complex are not exceeded.

ICDF Complex operational limits have been established to meet the requirements of the ROD and be protective of human health and the environment. The generator must be aware of ICDF Complex operational limits, and will be required to characterize, treat, and ship waste in compliance with those limits. They are described in detail in the following documents:

- ICDF Complex WAC, Sections 4 through 6. These sections describe the basis for waste acceptance (Section 4), acceptance criteria for interim staging and storage (Section 5), and acceptance criteria for the SSSTF (Section 6).
- ICDF Landfill WAC, Sections 4 through 5. These sections describe the basis for waste acceptance and acceptance criteria for the ICDF landfill.
- ICDF Evaporation Pond WAC, Sections 4 through 5. These sections describe the basis for waste acceptance and acceptance criteria for the ICDF evaporation pond.
- ICDF Complex Waste Verification SAP, Sections 2 through 7. These sections describe key operational parameters and verification sampling procedures for waste streams shipped to the ICDF Complex for treatment and/or disposal.

Key parameters are those contaminants or other characteristics that limit the operation of the ICDF Complex (e.g., WAC restrictions, operational constraints). These key parameters will drive ICDF Complex verification process/procedures for all Material Profiles submitted by the generator for acceptance at the ICDF Complex. A more detailed discussion is provided in Section 5 of the ICDF Complex WAC and Section 2 of the ICDF Complex Verification SAP.

4.2 Generator Requirements

Generators of waste destined for the ICDF Complex have general responsibilities under their CERCLA documentation (e.g., ROD, Remedial Design/Remedial Action Work Plan [RD/RAWP], SAP) and ICDF Complex operational documents. While these responsibilities are outlined in detail in Section 5 below, a review of the various CERCLA documents that will affect implementation is helpful.

4.2.1 Remedial Design/Remedial Action Work Plan

The generator's RD/RAWP outlines the remedial action and waste disposition options.

4.2.2 Sampling and Analysis Plan for CERCLA Remediation Activities

Sampling and analysis for characterization of the waste is a key component to preparation of the Material Profile for acceptance at the ICDF Complex. Characterization is discussed in detail in Section 5.1 of this document, and can be found in the ICDF Complex WAC (Sections 2.3 and 2.4) and guidance documents published by the Environmental Protection Agency (EPA) (EPA 2002).

Each generator is responsible for developing a SAP. The SAP is the primary support document for the Material Profile. The generator submits the Material Profile to ICDF Complex personnel, who will perform independent verification sampling as described in the *ICDF Complex Waste Verification Sampling and Analysis Plan*. (DOE-ID 2003). This plan will be made available upon finalization to all appropriate generators. As sampling occurs, the generator should understand that an unsupported conservative bias that is at or near the WAC limit will result in p and $1-\alpha$ in verification sampling requirements.

The SAP developed for the generator's CERCLA activities should (1) describe the sampling protocol, (2) identify requisite analysis, analytical methods, and data validation protocol, and (3) describe the process for characterizing the waste, including the physical state, material composition, and specific item description. The SAP describes the methods to be used to ensure that information is accurately recorded for transportation, storage, and disposal. As part of the SAP, each generator must develop a methodology to accurately document the percent by volume of each item type in the waste. Applicable analytical methods used to determine physical and chemical characteristics of each waste stream shall be addressed in the SAP. A guideline recently published by the EPA updates technical information for sampling and analysis regimes (EPA 2002). The generator should review this document, along with relevant INEEL guidance, prior to developing a SAP.

The SAP is the key document the generator uses to ensure that wastes are accurately characterized and provides the basis for objectively demonstrating compliance with the ICDF Complex, landfill, and/or evaporation pond WAC. Compliance with the SAP is assumed when a Material Profile is presented for approval at the ICDF Complex.

4.2.3 Other CERCLA Activities That May Require Characterization

Other CERCLA activities require sampling for waste characterization, but may not necessarily implement a sampling plan. For example, investigation-derived waste (IDW) is CERCLA waste that may be destined for the ICDF Complex. Other CERCLA wastes are generated as the result of a NOD implemented during a removal action. Sampling and analysis for characterization of these wastes must be performed to determine the physical, chemical, and radiological characteristics of the waste with sufficient accuracy to properly designate and manage the waste in accordance with the ICDF Complex WAC. The generator shall support IDW, NOD, or other CERCLA-generated waste characterization with proper sampling and analytical data or acceptable knowledge. The requirements for characterization are discussed in Section 5.1.

5. GENERATOR REQUIREMENTS

The generator has certain general responsibilities under the ICDF Complex Operations plan. They are described in detail in the ICDF Complex WAC and the ICDF Complex Waste Tracking Plan (PLN-914). Acceptance of a waste stream at the ICDF Complex is contingent upon effective implementation of these responsibilities.

Waste acceptance procedures are also based on the following assumptions:

- Characterization of the waste streams will be performed to determine the physical, chemical, and radiological characteristics of the waste with sufficient accuracy to properly designate and manage the waste in accordance with the ICDF Complex WAC, and will consider the key parameters identified for ICDF Complex operations.
- All waste streams entering the ICDF Complex will comply with the relevant WAC for ICDF Complex, landfill, and/or evaporation pond.

5.1 Characterization

The remediation waste generator must determine the physical and chemical characteristics of the waste with sufficient accuracy and detail to properly designate and manage the waste for acceptance at the ICDF Complex. Characterization of all waste submitted for acceptance into the ICDF Complex is the responsibility of the ICDF Complex user and must be completed before the IWTS Material Profile is submitted.

If waste characterization is accomplished through sampling and analysis, this characterization will be performed by each generator, who must identify and describe its sampling strategy (usually based on a SAP or other sampling strategy). This sampling strategy should identify the logic behind the characterization scheme, characterization methodology, protocols, and requirements for recordkeeping and documentation. Various test methodologies and sampling strategies are discussed in recent EPA guidance (EPA 2002).

Characterization shall be adequate to permit acceptance of the waste at the ICDF Complex, and identify constituents in the waste streams as well as key parameters. This can be done by using waste knowledge (e.g., process knowledge or previous sampling events), by sampling and analysis, or by a combination of the two (EPA 1994). Generally, SW-846 test methods (EPA 1986) or other methods with proper quality assurance and quality control standards provide sufficient verifiable information to prepare a suitable Material Profile. Section 2.4 of the ICDF Complex WAC, describes the requirements for physical and chemical characterization. Radiological characterization is discussed in detail in Section 2.5 of the ICDF Complex WAC.

As noted in Section 4.1.3, the ICDF Complex operations are limited by several key parameters. All waste characterization needs to include a discussion of these key parameters. The key parameters are described in the ICDF Complex Verification SAP (DOE-ID 2003). These key parameters must be considered and identified during characterization, generally by identifying if they are present in the waste stream by sampling and analysis or acceptable knowledge as described below.

5.1.1 Physical and Chemical Characterization

This section describes acceptable physical characterization requirements.

5.1.1.1 Types of Acceptable Knowledge. This section describes types of information that can be used for physical/chemical characterization including data from waste analysis and knowledge of the materials and/or processes used to generate the specific waste. Acceptable knowledge requirements can be met using one or more of the following:

- Mass balance from a controlled process that has a specified output for a specified input including time of generation
- Material Safety Data Sheets on unused chemical products
- Analytical data on the waste or a waste from a similar process, including sufficient information to demonstrate that the two wastes are essentially the same
- Test data from a similar process, including sufficient information to document that the waste is essentially the same as that from a similar process.

In addition, acceptable knowledge requirements can be met through the use of a combination of analytical data or screening results and one or more of the following:

- Documented interview information
- Logbooks
- Procurement records
- Qualified analytical data
- Radiation work packages
- Procedures and/or methods
- Process flow charts
- Inventory sheets
- Vendor information
- Mass balance from an uncontrolled process (e.g., spill cleanup)
- Mass balance from a process with variable inputs and outputs (e.g., washing/cleaning methods).

If the information is sufficient to quantify waste constituents and characteristics, as required by the regulations and facility-specific acceptance criteria, the information is considered acceptable knowledge. These types of information will require a separate concurrence by the ICDF Complex operations manager prior to the waste being accepted at the Complex.

5.1.1.2 General Knowledge Requirements. When a waste designation is based solely on process knowledge, the generating site must ensure that the chemical, physical, and radiological properties of the waste are adequately determined. The designation must be accomplished and documented with sufficient accuracy to ensure that subsequent treatment, storage, or disposal of the waste will be protective of human health and the environment. The logic used to make the designation must be

documented. The technical basis, including documented historical information, procedures, practices, and information gained from interviews, shall be documented. Any assigned listed waste codes apply to the waste stream throughout the disposition process.

The minimum level of acceptable knowledge must include (1) designation data where the constituents causing a listed waste code to be assigned are quantified, and (2) data that address acceptance criteria necessary for proper management of the waste. The generator should be aware of waste verification procedures outlined in the ICDF Complex Waste Verification Sampling and Analysis Plan (DOE-ID 2003). The information provided by the generator determines the level of verification necessary for entry into the ICDF Complex. Failure to meet the WAC limits and other verification criteria could result in rejection of the waste shipment.

Analytical data and/or knowledge of the waste must be sufficient to determine whether the waste is regulated under 40 CFR 261 or 40 CFR 761 and to assign correct hazardous waste codes (when applicable). When the available information does not qualify as acceptable knowledge or is not sufficient to characterize a waste for management, the sampling and testing methods commonly used to make a hazard determination may be required. The presence or absence of hazardous constituents by chemical analysis alone does not indicate that a listed waste is present. The only way a listed waste code can be assigned to a waste stream is through process knowledge.

In cases where constituents that could cause a waste to be listed are present in a process, but are not expected to be in the waste in concentrations causing the waste to be above LDRs (e.g., those wastes that have been generated outside the WAG 3 AOC or that have triggered placement), sampling and analysis must be performed to demonstrate that the constituents are below regulatory limits for land disposal. This requirement can be met through previous investigations, such as remedial investigations/feasibility studies (RI/FSs) or other CERCLA investigations. This sampling and analysis is required only for initial characterization of the waste stream.

Listed waste must be designated based on process knowledge. Other waste stream designations may be based on process knowledge and/or analytical data. The generating CERCLA project will perform a review to determine whether a listed waste source is present at the remediation waste site. The listed waste review will rely on readily available documents gathered as a part of the standard CERCLA site evaluation or RI/FS. For CERCLA OUs from which listed waste sources are reasonably expected, standard operator interviews should be augmented and documented as necessary to ask questions specifically aimed at identification of potential sources.

5.1.1.3 Land Disposal Restriction Knowledge. For hazardous waste (as defined in 40 CFR 261) that has been generated outside the WAG 3 AOC (or has triggered placement), waste characterization must be sufficient to establish whether the waste is a restricted waste under the LDR provisions of 40 CFR 268 or the alternative LDR treatment standards for contaminated soil under 40 CFR 268.49. If either of those LDR provisions apply, the applicable treatment standard(s) for that waste must be determined. Data from a CERCLA RI/FS can be utilized for this demonstration, if the sample is a representative sample as defined in 40 CFR 260.10 and the appropriate parameters were analyzed. If contaminated water is used in the treatment process, then applicable LDRs for nonwastewater as defined in 40 CFR 268.48 will be applicable.

All generators who generate waste streams outside the WAG 3 AOC must comply with LDRs prior to acceptance of the waste stream in the ICDF Complex, or the ICDF must treat the waste to meet LDRs prior to disposal.

5.1.1.4 Exceptions to Physical and Chemical Characterization Requirements. The following exceptions can be made to the physical/chemical characterization requirements stated previously:

- Hazardous debris managed in accordance with the alternative treatment standards for hazardous debris (40 CFR 268.45) does not require sampling and analysis for adequate physical/chemical characterization.
- However, hazardous debris that will not be treated (e.g., debris from remediation activities inside the OU 3-13 AOC) and contains other media such as sludge or soils must be characterized.
- Waste that cannot be fully characterized in accordance with the requirements stated previously may be characterized by an alternative management path negotiated with the ICDF Complex management (e.g., unique chemical or radiological hazards posing risks to workers that prevent full characterization of the waste).

5.1.2 Radiological Characterization

The major radionuclides (as defined in Section 2.5 of the ICDF WAC) in the waste and the concentration of each major radionuclide must be established with sufficient sensitivity and accuracy to properly classify and manage the waste in accordance with the associated radiological limits.

5.1.2.1 Identification of Major Radionuclides. For the purposes of the radiological criteria in this document, major radionuclides are defined as those radionuclides that meet any of the following conditions:

- Any transuranic (TRU) radionuclides present in the nonaqueous waste in concentration exceeding 1 nCi/g
- Any TRU radionuclides present in the aqueous waste in a concentration exceeding 1 nCi/L
- Any radionuclide that accounts for more than 1% of the total radiological activity of the waste
- Any fissionable radionuclide present in the waste in a quantity exceeding 0.1 fissile gram equivalent present per container
- Any mobile radionuclide present in a concentration that exceeds its reporting limit.

For waste that cannot be radiologically free released, an estimate of radiological constituents will be included in the Material Profile for tracking purposes.

5.1.2.2 Acceptable Knowledge and Methods for Establishing Radionuclide Inventories. The radionuclide inventory of a waste must be established through the use of a method or combination of methods capable of identifying and quantifying the major radionuclides present. The methods chosen must provide adequate sensitivity and accuracy to ensure that the waste meets the criteria.

A graded approach should be applied when planning radiological characterization. Using the graded approach, more frequent and detailed analysis and a higher level of statistical confidence are applied when the concentration of radionuclides in the waste approaches one or more of the limits of the

ICDF WAC or operational limits. Conversely, waste that measures far below these limits would not require as extensive or frequent analysis.

The following characterization methods can be used individually or in combination to establish the radionuclide inventory of the waste:

- Process knowledge includes documented knowledge of the radioactive materials used and the processes that contributed to the radiological content of the waste, along with historical analysis of waste and radiological contamination from the process. Process knowledge can be used to establish the suspected major radionuclides in a waste stream. In addition, process knowledge can be used to eliminate from further consideration those radionuclides not present in sufficient concentration to be major radionuclides, as long as the basis of this determination is documented. Process knowledge alone generally may not be sufficient to quantify the total radionuclide inventory of a waste.
- Direct measurement field and laboratory analysis methods, such as radiochemical analysis and surveys with field instruments, must be selected to appropriately detect and quantify the major radionuclides with adequate sensitivity and accuracy for waste classification. Analytical methods that measure gross activity (i.e., not radionuclide-specific) may be used in conjunction with other methods to determine the relative concentration (scaling factors) of each suspected radionuclide and may be corroborated periodically with radionuclide-specific analysis.
- Computer modeling, applied appropriately, may be used in conjunction with other methods for radiological characterization. An individual who is knowledgeable and experienced in the use and limitations of the model must perform the modeling. The assumptions and measurements used as inputs to computer modeling must be documented. The computer software must be controlled in a manner that meets conventional quality assurance requirements. Computer models must be corroborated periodically with direct measurement methods.
- Scaling factors can be used to relate the concentration of a readily measured radionuclide to radionuclides that are more difficult to measure. Scaling factors must be developed from one of the previous methods and should be corroborated periodically with radionuclide-specific analysis. Other methods of radiological characterization could be used but must be clearly documented and approved by the ICDF Complex management. Documentation of the method must include a detailed description of the method, the radionuclides identifiable by the method, and a discussion of precision, accuracy, quality assurance, and quality control methods.

5.1.2.3 Determining Radionuclide Concentrations. Guidance for determining concentrations of radioactive waste is found in the U.S. Nuclear Regulatory Commission's (NRC's) Issuance of Final Branch Technical Position on Concentration Averaging and Encapsulation, Revision in Part to Waste Classification Technical Position (NRC 1995). The technical position was issued for purposes of documenting the NRC's position regarding the application of averaging for purposes of determining the waste category in accordance with its promulgated regulation 10 CFR 61.55.

Radionuclide concentrations should be determined based on the volume or weight of the final waste form. Samples may be taken for analysis either from the final waste form or from the waste prior to processing into a final waste form. Where a liquid waste is stabilized (e.g., with grout) within a waste container, and the waste and the binder forms a solid mass within the container, the waste classification volume may be considered to be the volume of the stabilized mass. However, while the classification of stabilized liquids would be based on the volume and mass of the stabilized waste mass, the mass (or

volume) of materials onto which liquids are simply adsorbed would not be included in the mass (or volume) of the waste matrix.

Shielding configurations must be considered when calculating the mass of the waste package. The mass of the packaging container and any external shielding shall not be used when determining concentrations. Shielding materials in a shielded package, where the shielding materials are not to be disposed with the waste, are not to be considered part of the waste matrix. Shielding that is not readily removable and will be disposed with the waste should be considered part of the waste matrix. Most waste streams (e.g., spent ion-exchange resins, filter media, solidified liquids, or contaminated dirt) may be considered to be homogeneous and, therefore, an integral part of the waste mass for purposes of waste classification. Trash-contaminated waste streams that are composed of a variety of miscellaneous materials may be considered homogeneous for purposes of waste classification when samples are placed into containers. The activity of small concentrated sources within the trash (e.g., small check sources or gauges) may be generally averaged over the trash volume.

For the purpose of waste classification of large unpackaged components (e.g., pumps and heat exchangers), the concentration of a radionuclide may be averaged over the volume of the component. Where items are placed in a container, however, and the volume of the container is at least 10% greater than the waste, the volume used for waste classification should be that of the waste and not the gross volume of the container.

Because liquids absorbed into solid media (e.g., cat box litter) can desorb under some circumstances, classification of absorbed liquids should be based on the volume and mass of the liquids prior to absorption.

Large volumes of waste that will be segregated during disposal activities are to be classified based on the separate portions rather than on the accumulated whole. This rationale is based on the assumption that segregated portions will be disposed separately; the classification is to be based on the waste portion after any segregation has occurred.

This radioactive waste classification guidance is depicted in the following examples:

- A tank contains a radioactive heel. If the heel will not be removed but is to remain with the tank structure for disposal, then the mass of the tank structure and the heel may be added together to determine the concentration of radionuclides in the waste. The void spaces must be eliminated (e.g., crush or grout in the tank) before the waste is disposed. If the heel is to be removed separately, then the heel must be classified separately from the tank structure.
- A radioactive liquid requires disposal. The waste stream is to be treated using an immobilization medium (binder) to fix the material and make it solid. The classification of this liquid would be based on the volume of the stabilized material or on the mass of the solidified waste matrix.
- A concrete basin contains a radioactive sludge. A fixative is to be added to the sludge to stabilize any liquids. The stabilized sludge is to be removed and the basin walls scabbled to remove residue. In this case, the stabilized sludge and the scabbled material may be consolidated in order to classify the waste. The stabilized sludge and the scabbled material are of a similar nature and will be collected and disposed as a single waste. The concrete basin is classified separately from the sludge and scabbled material. If the basin walls are not scabbled, the residue and the walls may be combined to classify the concrete waste. If the sludge and the concrete walls are segregated prior to disposal, the concrete and the sludge cannot be combined to classify the waste.

- A slab of concrete is being removed along with contaminated soil. There will be no attempt to segregate the soil from the concrete. The broken pieces of concrete are mixed with the removed soil as a result of the removal activity, and all the material will be disposed together. In this case, the soil and the concrete may be classified together.

5.2 IWTS Material Profile

Each generator must prepare a Material Profile for approval before any waste stream is shipped to the ICDF Complex. As noted in Section 5.1, any generator using process knowledge must ensure that the chemical, physical, and radiological properties of the waste are adequately determined. The information provided on the Material Profile should allow statistically positive hits at the 95% upper confidence level to provide sufficient conservatism. This assumes a properly designed and executed sampling event rendered sufficient samples to defensibly represent the universe of waste being profiled.

The following ICDF Complex documents outline the development of a Material Profile sheet.

- ICDF Complex WAC, Section 3, “Waste Acceptance Process.” Describes the process and scheduling requirements for preparing Material Profiles. Specifically, Section 3.5 describes the required documentation for developing and submitting a Material Profile for approval by the ICDF Complex.
- ICDF Complex Waste Tracking Plan, Section 3. A step by step description of the process for preparing the Material Profile, including the following:
 - Preparation of the IWTS Material Profile (Section 3.1). The Material Profile describes the chemical, radiological, and physical characteristics for the waste stream, which are generally entered as maximum/minimum ranges to encompass all containers in the waste stream. IWTS automatically assigns the Material Profile a unique identification number beginning the process of electronically tracking the waste.
 - Preparation of the IWTS Container Profile (Section 3.2). The Container Profile documents and quantifies the chemical, radiological, and physical characteristics for that particular container. These characteristics are entered as specific values and that are bounded by the maximum/minimum ranges of the associated Material Profile. Supporting information specific to the individual containers, such as special handling instructions, identification of a nonstandard waste container, and documentation of physical contents verification is also provided in the Container Profile.
 - Preparation of the IWTS Shipment Task and waste packaging and shipment requirements (Section 4). The complex user creates an IWTS shipment task and completes the “execute send” portion of the task. In addition, an On-Site Waste Tracking Form (OWTF) must accompany the shipment to the ICDF Complex. A shipment sent without prior arrangement will be returned to the generating WAG.
 - Procedures for accepting waste (Section 5), including compliance with the ICDF Complex Verification SAP and procedures ICDF personnel follow once the waste stream is accepted.

6. ICDF COMPLEX WASTE ACCEPTANCE PROCESS

The following presents an overview of the waste acceptance process. A detailed description of the waste acceptance process is described in the following documents:

- ICDF Complex WAC, Section 3, “Waste Acceptance Process.” Describes the process and scheduling requirements for preparing Material Profiles.
- ICDF Complex Waste Tracking Plan (PLN-914). Sections 4 through 6 describe the general process for preparing Material Profiles, as well as accepting and tracking waste at the ICDF Complex.

6.1 Material Profile Implementation

6.1.1 IWTS Material Profile

The process that the ICDF Complex user and ICDF personnel follow to create and approve the generator’s Material Profile can be found in the ICDF Complex Waste Tracking Plan (PLN-914), Section 3.1.

6.1.2 IWTS Container Profile

The process that the ICDF Complex user and ICDF personnel follow to create and approve the generator’s container profile can be found in the ICDF Complex Waste Tracking Plan (PLN-914), Section 3.2.

6.1.3 IWTS Shipment Task

The process that the ICDF Complex user and ICDF personnel follow to create and approve the generator’s shipment tasks can be found in the ICDF Complex Waste Tracking Plan (PLN-914), Section 4.2.

6.2 Waste Acceptance Overview

This section provides a general overview of the processes described in this document:

- The generator characterizes the waste stream pursuant to the data collection requirements identified in the OU’s sampling strategy (e.g., SAP), including consideration of the ICDF Complex key parameters.
- The generator prepares an IWTS Material Profile using instructions found in the ICDF Complex WAC and the ICDF Complex Waste Tracking Plan (PLN-914).
- ICDF Complex personnel review the Material Profile as described in PLN-914. If there is a conflict between the Material Profile, the generator’s hazardous waste determination, or ICDF verification sampling results, ICDF personnel will work with the generator to resolve the discrepancy.
- For each container sent to the ICDF, the generator prepares a container profile as described in PLN-914. The container profile is bounded by the Material Profile.

- The generator prepares the Material Profile, container profiles, and shipment task, and is assigned a shipment date/time.
- ICDF personnel in accordance with the ICDF Complex Verification SAP will direct verification sampling. Sampling may occur either at the dig site, or at the ICDF Complex.
- The generator completes the “execute send” portion of the shipment task initiating tracking of waste from generating site to the ICDF Complex.
- Upon receipt of the waste shipment from the generator, a receipt inspection of the waste will be performed.
- After receipt inspection is completed, the waste placed in the landfill according to the ICDF waste placement plan.

6.3 Verification

Verification of Material Profiles by ICDF Complex personnel is governed by the ICDF Complex WAC, as well as the ICDF Complex Waste Verification SAP.

7. REFERENCES

- 40 CFR 264, 1999, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, Office of the Federal Register, July 1999.
- 40 CFR 264, Subpart CC, 1999, "Air Emission Standards Tanks, Surface Impoundments, and Containers," *Code of Federal Regulations*, Office of the Federal Register, July 1999.
- 40 CFR 264.1082, 1999, "Standards: General," *Code of Federal Regulations*, Office of the Federal Register, July 1999.
- 40 CFR 264.1083, 1999, "Waste Determination Procedures," *Code of Federal Regulations*, Office of the Federal Register, July 1999.
- 40 CFR 265, 1999, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, Office of the Federal Register, July 1999.
- 40 CFR 265.1081, 1999, "Definitions," *Code of Federal Regulations*, Office of the Federal Register, July 1999.
- 40 CFR 268, 1999, "Land Disposal Restrictions," *Code of Federal Regulations*, Office of the Federal Register, July 1999.
- 40 CFR 268.48, 1999, "Universal Treatment Standards," *Code of Federal Regulations*, Office of the Federal Register, July 1999.
- 40 CFR 268.49, 1999, "Alternative LDR Treatment Standards for Contaminated Soil," *Code of Federal Regulations*, Office of the Federal Register, July 1999.
- 42 USC 6921 et seq., 1976, Subtitle C, "Hazardous Waste Management," in "Resource Conservation and Recovery Act of 1976," United States Code (as amended).
- 15 USC 2601 et seq., 1976, "Toxic Substance Control Act," United States Code.
- DOE-ID, 1999, *Final Record of Decision, Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13*, DOE/ID-10660, Rev. 0, Department of Energy Idaho Operations Office, U.S. Environmental Protection Agency Region 10, and State of Idaho Department of Health and Welfare, October 1999.
- DOE-ID, 2002a, *Waste Acceptance Criteria for ICDF Landfill*, DOE/ID-10865, Rev. 2, Department of Energy Idaho Operations Office, May 2002.
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- EPA, 2002, *RCRA Waste Sampling Draft Technical Guidance, Planning, Implementation, and Assessment*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response EPA 530-D-02-002, October 2002
- HWMA, 1983, "Hazardous Waste Management Act of 1983," Idaho Code Sections 39-4401 et seq., 1983.
- NRC, 1995, *Issuance of Final Branch Technical Position on Concentration Averaging and Encapsulation, Revision in Part to Waste Classification Technical Position*, U.S. Nuclear Regulatory Commission, Washington D.C.
- PLN-914, 2003, "Waste Tracking Plan for the INEEL CERCLA Disposal Facility Complex," Rev. 0, Department of Energy Idaho Operations Office, February 2003.

Appendix A
IWTS Material Profile Screen

Appendix A

IWTS Material Profile Screen

The following sample Material Profile screen shows a properly prepared Material Profile sheet. It does not represent any waste stream destined for disposal at the ICDF Complex. All generators must prepare Material Profiles for each waste stream destined for the ICDF Complex as required by the ICDF Complex WAC and outlined in this guidance document.

Appendix B
IWTS Container Profile Screen

Appendix B

IWTS Container Profile Screen

The following sample Container Profile screen shows a properly prepared IWTS Container Profile sheet. It does not represent any waste stream destined for disposal at the ICDF Complex. All generators must prepare Container Profiles for each waste stream destined for the ICDF Complex as required by the ICDF Complex WAC and outlined in this guidance document.

Appendix C
IWTS Shipment Task Screen

Appendix C

IWTS Shipment Task Screen

The following sample shipment task screen shows a properly prepared shipment task. It does not represent any waste stream destined for disposal at the ICDF Complex. All generators must prepare shipment task profile for each waste stream destined for the ICDF Complex as required by the ICDF Complex WAC and outlined in this guidance document.

